

South Dakota  
Science and Technol  
Authority

Homestake Mining  
Company

Administration Building  
630 East Summit Street

# Homestake DUSEL *Proposal Overview* *Management and Operations*

Kevin T. Lesko

April 20, 2007



# The Homestake Proposal

- At Homestake, what will be the hand-off for DUSEL in 2010? What will be in place and operating?
- Overview of how will we develop Homestake into a dedicated, multidisciplinary user facility for underground science, engineering and education?

# The Homestake Proposal

- Proposal Overview - [Kevin Lesko](#)
- Advances and Progress at Homestake - [Dave Snyder](#)
- Environment, Health and Safety - [Marty White & Tom Regan](#)
- Physical Characteristics - [Bill Roggenthen & Herb Wang](#)
- Access to the Underground, User Support and Environment - [Kevin Lesko](#)
- Education and Outreach - [Ben Sayler](#)
- Project Management and Systems Engineering - [Dick DiGennaro](#)
- Science Goals - [Derek Elsworth & Harry Nelson](#)
- Summary/Discussion

# Initial Steps in Creating DUSEL

- Property is deeded to the South Dakota Science and Technology Authority
  - No issues about ownership or access
  - No conflicting or competing purposes or uses
  - Site has been prepared and inspected
  - Insurance and Indemnification are in-place
- Steps to reestablish access to the underground are underway
  - Adaptation of the surface buildings
  - Rehabilitation and reentry of the Ross Shaft
  - Permits to pump and discharge water in place as of June
  - Initial Safety Programs established for Reentry work

# Initial Steps in Creating DUSEL

- **Early Implementation Program for Science and E&O**
  - Need to enter the facility to preserve site
  - Decision to create an early research opportunity
  - Steps underway to tailor site for this program
  - Phased approach to creating DUSEL
- **Science and E&O Program Development**
  - Call for Letters of Interest ~ 85 responses
  - Topical and Experimental Workshops and Meetings
  - Strong E&O Program
  - Program Advisory Committee
  - Developing of Memoranda of Understanding
  - Acquiring Requirements for initial design and phasing of development

# Initial Steps in Creating DUSEL

- Secured Substantial State and Private Funding
  - \$46M controlled by the Authority: HUD grant and substantial funding appropriated by South Dakota State Legislature
  - \$70M philanthropic donation by T. Denny Sanford
  - \$8M donation Great Plains Foundation for Cyberinfrastructure in South Dakota and Homestake\$124M total
- Building a Diverse, Strong, and Talented Scientific Collaboration
  - ~ 150 - 200 membership
  - World-recognized experts in essentially all disciplines

# List of Workshops and Meetings

- 1 November 2005 - Call for Letters of Interest
- 4 December 2005 - AGU SF workshop I
- 8 December 2005 - AGU Town Meeting
- 9 December 2005 - AGU SF workshop II
- 9 - 11 February 2006 - Lead South Dakota
  - Education and Outreach workshop
  - Physics Experiments workshop
  - Letters of Interest Presentations
- 18 - 19 March 2006 Final PAC Meeting
- 26 - 30 March 2007 Engineering Meeting
- ~ 40 Colloquia and Seminars by Homestake PIs



# Homestake Proposal Personnel

## DUSEL Project Team

Kevin T. Lesko, UC Berkeley  
William Roggenthen, SDSM&T  
Dave Snyder, SDSTA  
Richard DiGennaro, LBNL  
Liz Exter, LBNL  
Dianna Jacobs, LBNL  
Greg King, SDSTA  
Tom Regan, SDSTA  
Trudy Severson, SDSTA

## Physics

### Dark Matter

Andrew Hime, Los Alamos National Laboratory  
Tom Shutt, Case Western Reserve

### Geoneutrinos

Nikolai Tolich, LBNL

### Long Baseline Neutrinos & Nucleon Decay

Milind Diwan, Brookhaven National Laboratory  
Sasha Kopp, University of Texas, Austin  
Ken Lande, University of Pennsylvania  
Bill Louis, Los Alamos National Laboratory

### Low Background Counting

Yuen-dat Chan, LBNL  
Tina Keller, University of South Dakota  
Bob McTaggart, South Dakota State University  
Dongming Mei, University of South Dakota

### Neutrinoless Double Beta Decay

Yuen-dat Chan, LBNL  
Reyco Henning, University of North Carolina  
Alan Poon, LBNL  
Kai Vetter, UC Berkeley

### Solar Neutrinos

Robert Lanou, Brown University  
Bruce Vogelaar, Virginia Tech

### Theory, Neutrinos

Hitoshi Murayama, UC Berkeley

## Biology, Geoscience, and Geoengineering

### Ecology, Environmental Sciences, Geomicrobiology

Sookie Bang, SDSM&T  
Terry Hazen, LBNL  
Tommy Phelps, ORNL

### Economic Geology

Robert Bodnar, Virginia Tech  
Colin Paterson, SDSM&T

### Geochemistry, Heat Flow, Coupled Processes

C. Page Chamberlain, Stanford  
Rick Colwell, Oregon State  
Mark Conrad, LBNL  
Eric Sonnenthal, LBNL

### Hydrology, Rock Mechanics

Rohit Salve, LBNL  
Herb Wang, University of Wisconsin  
Joe Wang, LBNL

### Sensors, Seismic Geophysics, Civil Engineering, Geotechnical Engineering

Steven Glaser, UC Berkeley  
Lane Johnson, UC Berkeley  
Chris Laughton, FNAL

### Education and Outreach

Michael Barnett, LBNL  
Willi Chinowsky, UC Berkeley  
Stu Loken, LBNL  
Dan Farrington, SDSTA  
Ben Sayler, Black Hills State University

### Administrative Assistance

Melissa Barclay, UC Berkeley  
Laurie Gehner, SDSTA



# Experience & Qualifications of the Project Team

- **Extensive Experience on Underground Research Projects, and Users' Facilities**

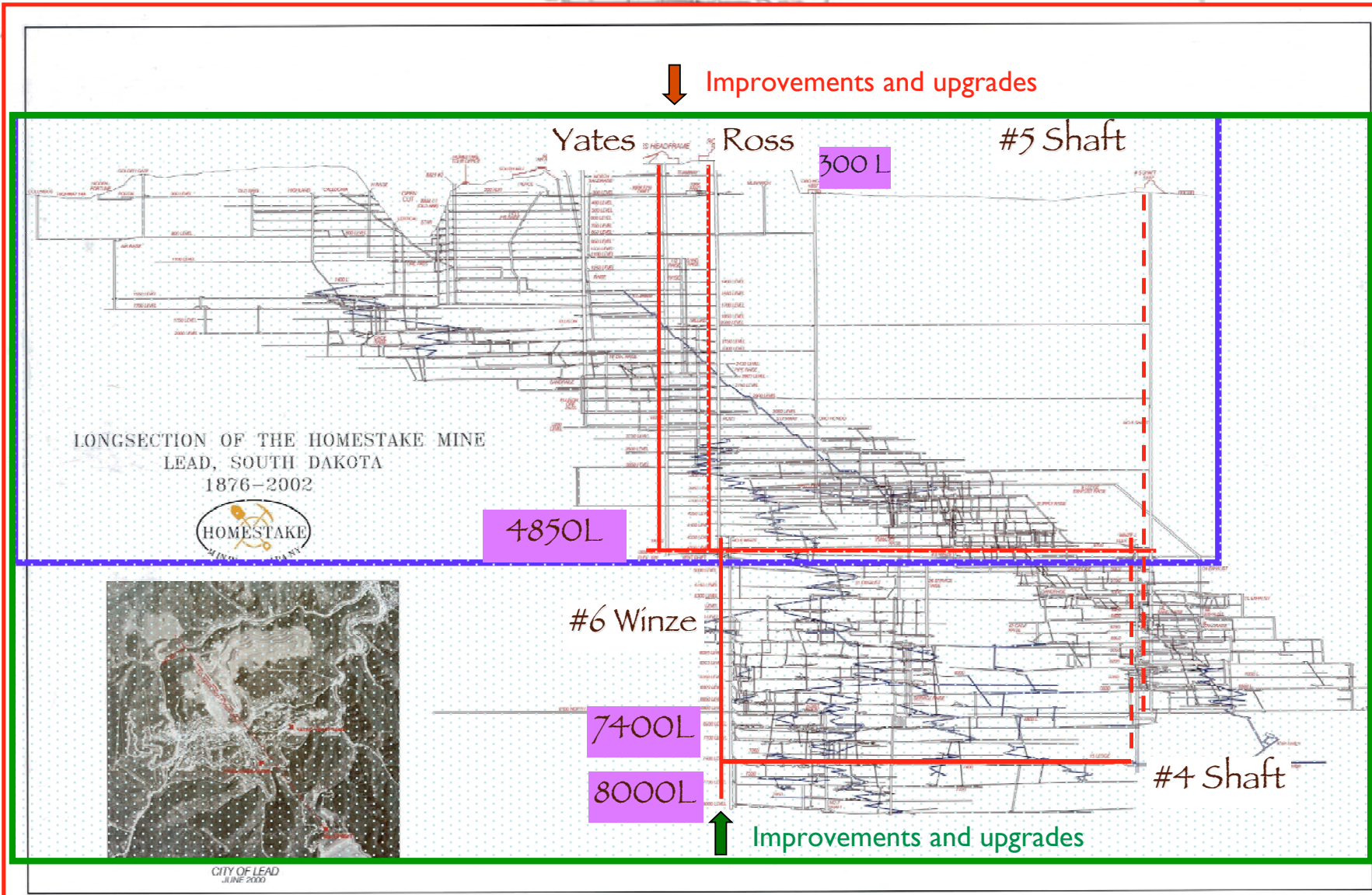
- Davis Chlorine Experiment - Homestake
- Sudbury Neutrino Observatory - SNO/SNOlab, Canada
- KamLAND - Mt. Ikenayama, Japan
- Borexino, XENON10 - Gran Sasso, Italy
- miniBooNE, MINOS, CDMS - FNAL, Soudan
- Yucca Mountain - Nevada
- WIPP - New Mexico
- Stripa - Sweden
- Gold Mines, South Africa
- Continental Drilling
- EarthLab
- EarthScope
- Genomes To Life
- Incorporated Research Institutes for Seismology
- SECUREarth
- Advanced Light Source - LBNL
- Joint Genome Institute - LBNL



# Phased approach to building DUSEL

- 2006 - 2010 State-Operated Homestake Interim Lab
  - Substantial site improvements and development prior to DUSEL
  - Strong collaboration with DUSEL Project and Scientists
  - Key Staff positions identified and filled earlier
  - Permits a phased “start” to DUSEL
  - Enables Critical R&D activities to build an advanced and diverse Initial Suite of Experiments
  - Science can begin even before DUSEL is funded
  - Initiates an earlier community building effort

# Phased approach to building DUSEL



# Dedicated, Multi-campus Facility

300L R&D, E&O

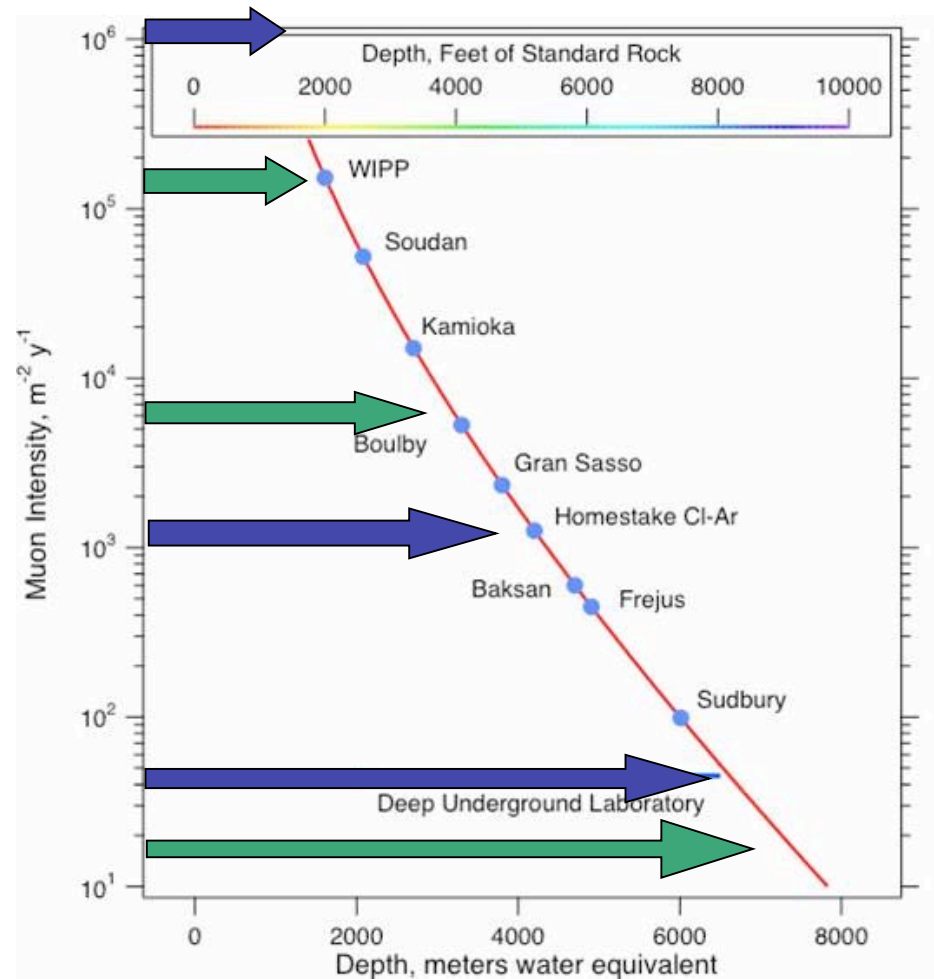
2000L Geo Level

3800L Geo Level

4850L Major Campus

7400L Major Campus

8000L Geo Lab



# Dedicated, Multi

300L R&D, E&O

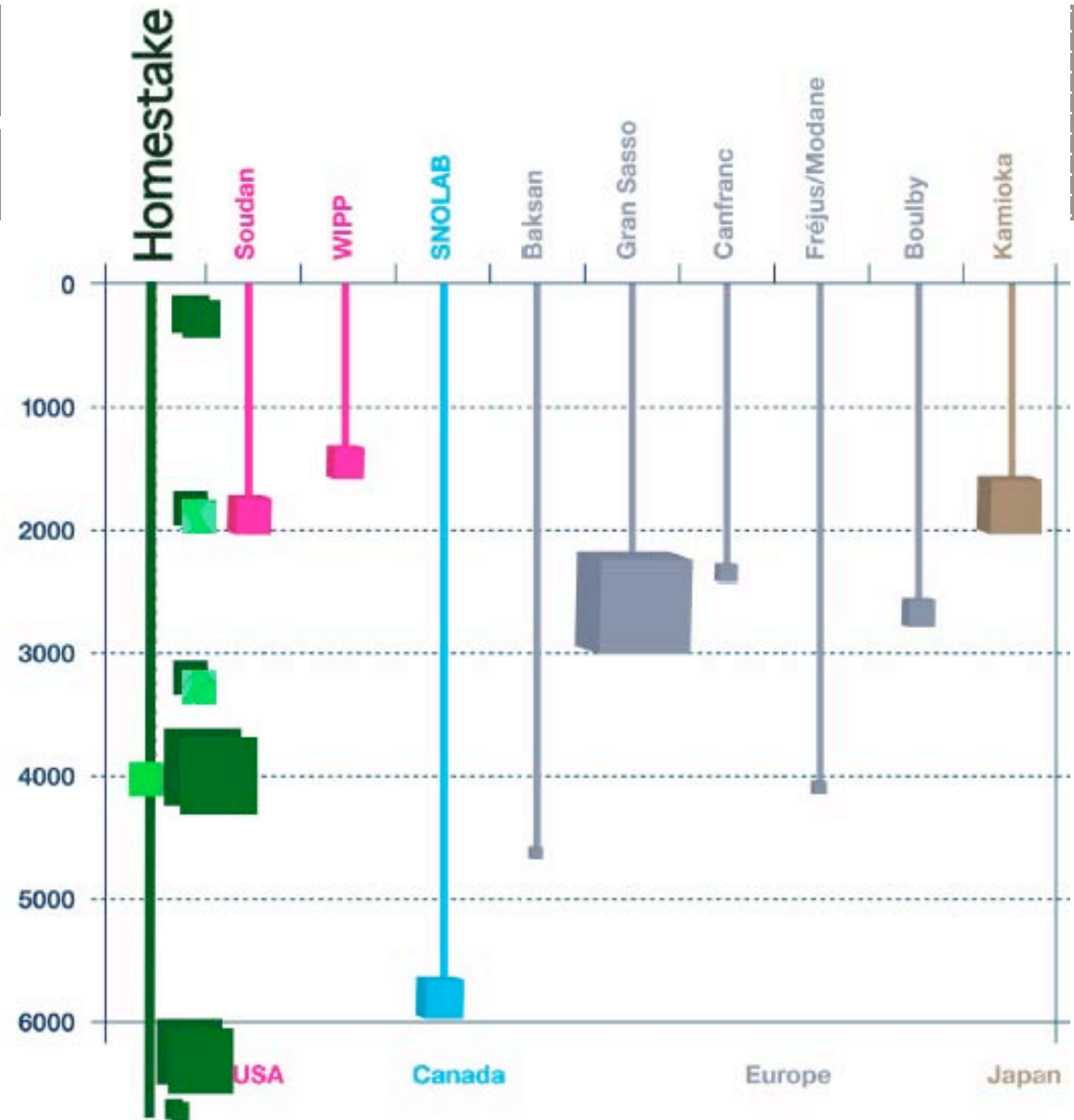
2000L Geo Level

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4850L Major Campus

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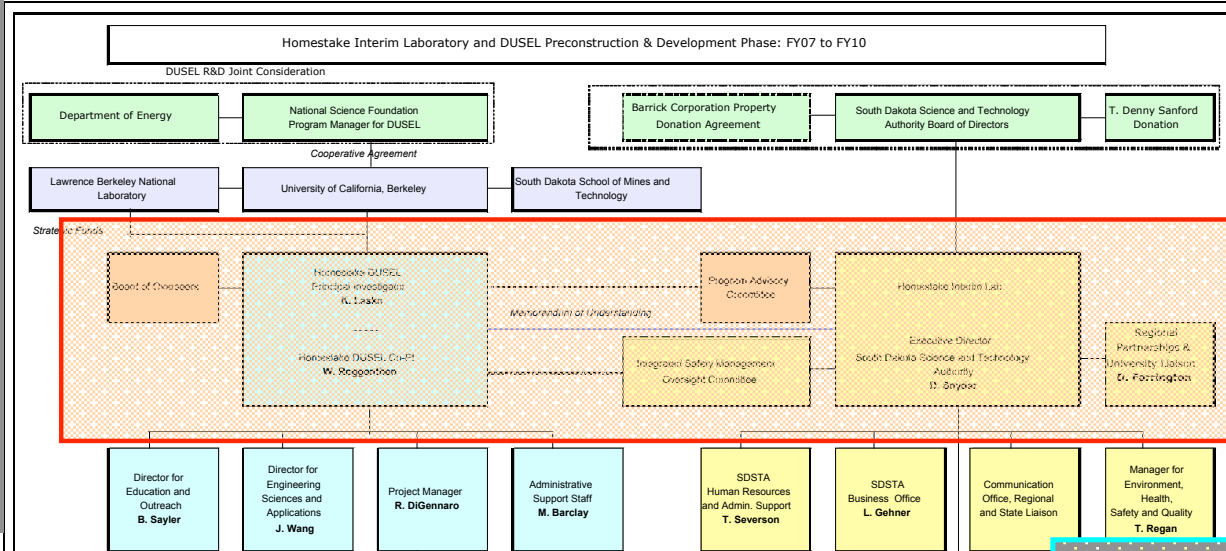
8000L Geo Lab





# Homestake Organization & Interim Laboratory Operations Prior to MREFC

Scientific Program & Scientific Requirements - Homestake Scientific Collaboration



Facility Development - SDSTA Development of Homestake Interim Facility

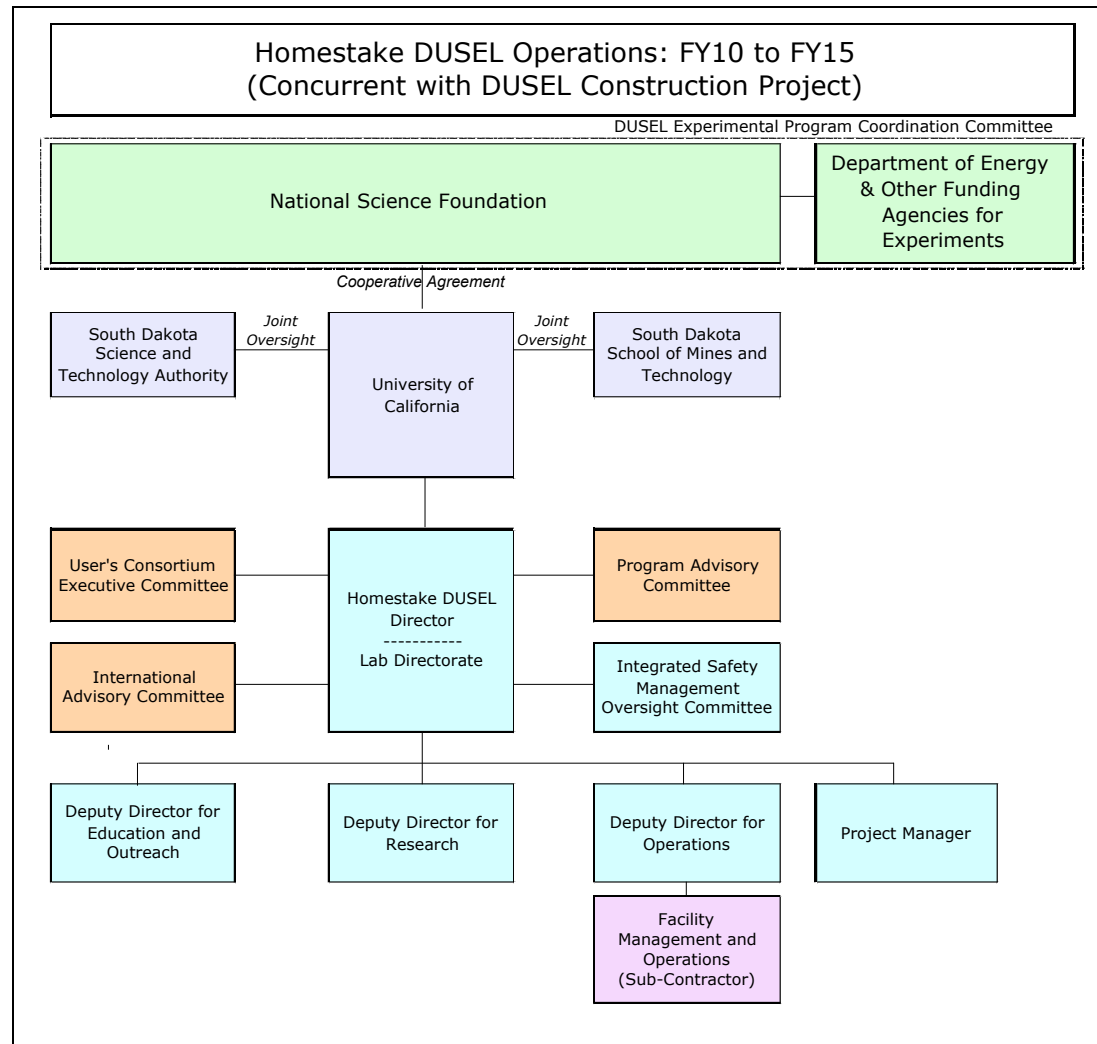
Oversite and Review  
Collaboration Executive Committee  
Board of Overseers  
Internal Review Committees  
SDSTA Board

Scientific and Safety Programs  
Program Advisory Committee  
Safety Management Committee

Reports and Consultant Services  
Golder Associates  
Syd DeVries  
Mark Laurenti  
Dynatec Corp  
RESPEC  
NIOSH

Additional Support  
SDSTA Staff and Contractors  
SD Office of State Engineer  
Former HMC Staff  
SDGS  
CAMSE, QuarkNet  
Workshops, LOIs, MOUs  
Homestake MC

# Homestake Organization through the MREFC

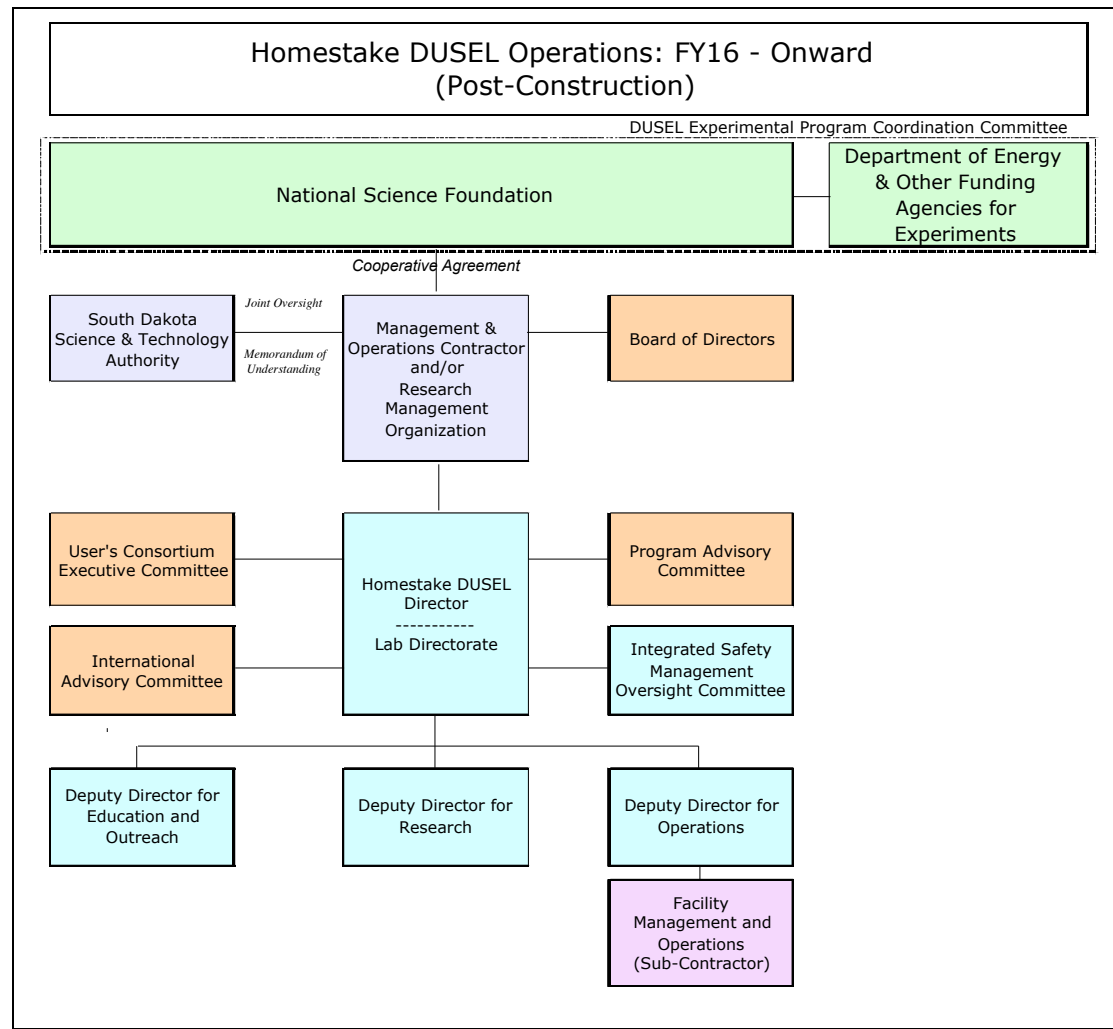


Consolidate  
Organization to  
Develop DUSEL

Many Trained Staff  
Transition Directly  
into MREFC Efforts



# Homestake Organization during DUSEL Operations



Introduce  
Laboratory M&O  
Contractor / Entity

Many Staff  
Positions Transition  
into DUSEL

# Homestake DUSEL

- Compelling Arguments for Siting DUSEL at Homestake

- Physical Characteristics and Key Parameters

- Depth and Location

- Rock

- Well known and researched

- Demonstrated ability to support large cavities for decades

- Interesting and varied geology, pristine regions

- Local, State, Regional & National Support

- Access and Research Environment

- Management and Operations

- Safety Program

- Science and Education Opportunities

- Excellent Time and Cost to Science

- No excavation needed to gain access to 8000

- Reduced Risks and Uncertainties

- Deepest, Most Expedient, Extremely Cost Effective

